ECTION 31 1316 - TREE PRUNING – ADDENDUM REVISION

PART 1 - GENERAL

1.1 GENERAL PROVISIONS

A. Requirements set forth herein are in addition to and shall be considered as complementary to the Terms and Conditions for Construction and the balance of Divisions 00 and 01 and Technical Specifications.

B. All Contractors, Subcontractors, Vendors and the like shall be required to familiarize themselves with said provisions.

1.2 SUMMARY

A. The work of this Section consists of providing all labor, equipment, materials, incidental work, and construction methods necessary to perform selective pruning and related trenching within the limits indicated on the Contract Documents and as specified herein. Work shall include, but not be limited to, the following:

1. Crown pruning
2. Vegetation removal at grade, including but not limited to trees, shrubbery, weeds, grasses, vines and other miscellaneous vegetation growing out of the river bank as indicated or above the river walls as indicated.
3. Trees to be removed will have been flagged in advance by the City. Do not commence the work of tree removal without a clear understanding of which trees have been designated for removal
4. Vegetation removal from river walls, including but not limited to trees, shrubbery, weeds, grasses, vines and other miscellaneous vegetation growing out of the joint and voids in the river walls. The work of removing vegetation from river walls is part of the Base Bid of this Contract.
5. Removal of all rubbish, debris, and other materials to be disposed of as a result of the work of this section.

B. Tree pruning shall be performed by the Contractor’s Approved Arborist (CAA) as defined under Article QUALITY ASSURANCE in this Section.

1.3 RELATED WORK

A. The following items of related work are specified and included in other Sections of the Specifications:

1. Section 012300 ALTERNATES – Attention is directed to Alternate No 3. The work of removing vegetation from the face of the river wall shall be performed as part of the Base Bid work of this Contract.
2. Section 015000 TEMPORARY FACILITIES; Portable tree protection fencing.

3. Section 015639 TREE AND PLANT PROTECTION; Semi-permanent tree protection fencing, tree removal, burlap, mulch and compost, ballast, fertilizers, protection of tree roots to remain.
4. Section 024113 SELECTIVE SITE DEMOLITION
5. Section 32 9300 PLANTING

1.4 REFERENCES

A. The following standards shall apply to the work of this Section.

1. American National Standards Institute (ANSI):
   a. A300 Tree Care Operations; Tree, Shrub, and Other Woody Plan Maintenance, Standard Practices
      1) Part 1, Pruning
      2) Part 2, Fertilization
      3) Part 3, Support Systems a. Cabling, Bracing, and Guying
2. Z133.1 Safety Requirements for Pruning, Trimming, Repairing, Maintaining and Removing Trees, and for Cutting Brush
3. Massachusetts Food and Agriculture Department (MA):
   a. Ref. 1 Control Recommendation Guide for Insect, Disease, and Weed Pests of Shade Trees and Woody Ornamentals

1.5 SUBMITTALS

A. The Contractor shall submit to the Owner's Representative for review, proposed schedule indicating specific dates for implementing specific work items.

B. At least 30 days prior to ordering materials, the Contractor shall submit to the Owner's Representative all representative samples, certifications, manufacturer's product data and certified test results for materials as specified below. No materials shall be ordered or delivered until the required submittals have been reviewed and approved by the Owner's Representative. Delivered materials shall closely match the approved samples. Approval shall not constitute final acceptance. The Owner's Representative reserves the right to reject, on or after delivery, any material that does not meet these Specifications.

1. Fertilizer:
   a. Submit product literature of planting fertilizer and certificates showing composition and analysis. Submit fertilization rates for fertilizer product based upon soil testing, analysis, and recommendations as described in this Section.
2. Inoculants and biostimulants:
   a. Submit product literature and certificates showing composition and analysis. Submit manufacturer's recommended application rates.

C. At least 90 days prior to the start of construction activities, submit to the Owner name of professional Certified Arborist hired to perform the work of this Section and proof of arborist's certification. http://www.massarbor.org/

1.6 QUALITY ASSURANCE

A. Selective pruning methods shall conform to the applicable requirements of ANSI Z133.1.

B. Work of this Section shall be completed by a professional Certified Arborist with a minimum five years' experience, who has successfully completed a certification program equal to the Massachusetts Certified Arborist (MCA) program/examination sponsored by the Massachusetts Arborists Association.

C. No less than 30 days prior to the start of tree clearing and removal, arrange for an on-site meeting with the City, the Owner's Representative, the General Contractor and the contractor responsible for the work of this Section to review the trees to be removed. Coordinate the meeting no less than 10 working days prior to the meeting.

1.7 COORDINATION

A. Coordinate the work of Section 024113 SELECTIVE SITE DEMOLITION for pavement removal within tree protection zones with the work of Section 311317 PNEUMATIC EXCAVATION for trenching related to root protection and root pruning.

1.8 SEQUENCING AND SCHEDULING

A. General:

1. The proposed schedule of tree protection work, pneumatic excavation, root pruning, pruning, and fertilizing work submitted by the Contractor, including corrections or revisions by the Owner's Representative's review, shall be adhered to. Changes shall be allowed only on written approval by the Owner's Representative.

1.9 WARRANTY

A. Refer to Section 015639 TREE AND PLANT PROTECTION for Liability for Damages to trees to be protected.

PART 2 - PRODUCTS

2.1 MATERIALS - ROOT AND CROWN PRUNING

A. Mulch, burlap, miscellaneous materials – Section 015639 TREE AND PLANT PROTECTION

B. Fertilizer shall be a commercial product complying with the State and United States fertilizer laws. Deliver to the site in the original unopened containers that shall bear the manufacturer's certificate of compliance covering analysis. Liquid fertilizer for subsurface hydraulic injection to correct soil nutrient deficiencies shall be a product meeting the requirements of ANSI 300 and as modified by this paragraph. Liquid fertilizer shall include a slow release form of nitrogen (50% of N to be water insoluble),

phosphorus and potassium; shall be chloride free; shall have a low salt content; and shall have a wetting agent to aid with dispersion. Fertilizer shall contain required micro-nutrients established by soil test analysis.

2.2 PLANTING SOIL

A. On-site topsoil excavated by pneumatic excavation is not suitable for reuse on this project. Provide off-site planting soil meeting the requirements of Section 329113 PLANTING SOILS.

2.3 COMPOST – in accordance with the requirements of Section 329113 Planting Soil.

2.4 TREE PROTECTION BALLAST

A. Section 015639 TREE AND PLANT PROTECTION.

PART 3 - EXECUTION

3.1 PREPARATION

A. The Contractor shall be responsible for the protection of all existing trees and plants designated to remain for the length of the construction period, including liability for all damages as specified in Section 015639 TREE AND PLANT PROTECTION.

3.2 ROOT PRUNING

A. General

1. Where construction will be in close proximity to existing trees designated to remain, main buttress roots shall be exposed for inspection and analysis by pneumatic excavation in accordance with the requirements of Section 311317. Root pruning and root protection shall only occur after this inspection and analysis phase of work.
2. Coordinate the removal of pavement and precast concrete curb, gutter and pavement slabs specified under Section 024113 SELECTIVE SITE DEMOLITION with Section 311317 PNEUMATIC EXCAVATION with root pruning specified in this Section 311316.

B. Root pruning is the physical cutting of tree roots to minimize root damage and promote healing. Root prune using a sharpened spade for all roots smaller than one-inch diameter. Root prune using an ax or chainsaw for all roots greater than one-inch diameter. Any method that tears roots or disturbs the soil beyond the grading limit is unacceptable. Do not use backhoe bucket or any other excavating machine to root prune.

C. During the tree removal process, take great care to avoid damage to existing tree roots. Protect and retain all tree roots of trees to remain.

3.3 BACKFILLING TRENCHES, EXCAVATION PERFORMED FOR ROOT PRUNING AND ROOT INVESTIGATION

A. Backfilling of pneumatic excavations shall be performed with care not to damage exposed roots.

B. Backfill mix shall be comprised of the following materials in the specified proportions:

1. Approved planting soil -85% by volume
2. Approved compost – 15% by volume
3. Mychorrhizal fungi and biostimulants – manufacturer's recommended rates

C. Tamp soil in 6-inch lifts without damage to existing roots to remain. Each lift shall be compacted to a point at which a footprint makes only a slight impression.

D. Apply mulch to a depth of 4 inches over top of extent of excavation area.

3.4 TREE PRUNING

A. Trees designated to be pruned during construction shall be pruned by the Certified Arborist. See Section 015639 TREE AND PLANT PROTECTION for requirements of the Contractor's Certified Arborist.

B. Any accidental injuries to the bark, trunk or branches of any tree shall be brought to the attention of the Certified Arborist and the Owner's Representative and repaired immediately as directed by the Owner's Representative.

C. All pruning must be done in compliance with American National Standards Institute Z133 and A300 standards.

D. All pruning cuts shall be made according to ANSI A300 section 5.2.5. No stubs shall be left nor shall flush cuts be made, the branch collar shall be left intact. Severed limbs shall be removed before the end of the workday. Wound dressing shall not be applied.

E. Tree branches shall be removed in a manner that does not damage the tree, other plants or property. Where necessary, ropes shall be used to lower large branches. Not more than 1/4 of the leaf surface of a tree shall be removed. Upon completion of pruning, one half or the foliage shall remain evenly distributed in the lower two thirds of the tree crown and on individual limbs.

F. The following classes of pruning shall be used as designated on the Drawings:

1. Crown cleaning: Trees designated for crown cleaning shall have dead, dying, diseased and/or weak branches one inch in diameter and larger removed. Not more than one out of 4 water sprouts shall be removed when present. One stem of weakly attached "V-crotches" less than 4 inches in diameter shall be removed. The presence of larger V-crotches shall be noted and provided to the Owner.
2. Crown raising: Trees may be designated for crown raising as well as one of the two other types of pruning. Crown raising shall consist of removal of lower limbs

at the trunk or the removal of smaller branches that will allow the upward movement of a lower limb to provide 8 feet of clearance.

G. All appropriate safety regulations must be followed. A ground person must be situated to direct pedestrian traffic and to maintain a safe work site.

3.5 TREE AND SHRUB FERTILZIATION

A. Fertilize existing and new trees and shrubbery on grade, above the river walls. Do not fertilize trees along the river banks shown to remain.

B. A fertilizer compliant with ANSI A300 standards shall be applied to all trees and shrubs specified in the contract.

C. The fertilizer label specifying the guaranteed analysis, amount of water insoluble nitrogen (WIN) and salt index shall be submitted to the Contract Officer with the bid. The nutrient ration (N:P:K) shall be 4:1:1:, 3:1:1 or 3:1:2. WIN number shall be between 50 to 75 percent. Salt index shall be less than 50.

D. Application rate shall be based on nitrogen content. Nitrogen shall be applied at a rate of 3# per 1000 square feet for mature and recently transplanted trees and shrubs. To promote growth the nitrogen rate on immature trees and young, established shrubs shall be 6# per 1000 square feet with in the plant's dripline.

E. Application may be to the soil surface or injected below the soil surface in shrub beds. Fertilizer may be a liquid suspension or granular material. Application to foliage should be avoided.

F. Applications to trees should be in the form of a subsurface soil injection. Injection sites should be removed near the trunk to near the dripline in a grid pattern with 3 feet by 3 feet spacing. Injections shall be 6 to 8 inches below the soil surface at a pressure not to exceed 200 psi. Fertilizer shall be evenly distributed within the dripline.

3.6 INSECT SPRAYING

A. Contractor’s Certified Arborist shall inspect all trees within the contract limit line and above the river walls and promptly notify the Owner’s Representative in writing of the presence of disease and pest infestations, weak crotches requiring bolting or cabling, or other tree care related issues that requiring action to protect the health of plant material within the project or to protect public health and safety. Include in written notification suggested treatment including chemical agents, dormant oil sprays, plant removal, cabling and bolting, or other options, as well as scheduling of effort.

3.7 PROTECTION OF TREE ROOTS

A. Place construction ballast plywood in advance of the movement of construction vehicles across plant beds or lawn areas. Ballast shall be installed to prevent vehicular loading on top of planting soils. Remove ballast as soon as the vehicles have passed over the protected zones. Ballast left in place for more than one day can prevent oxygen exchange between atmosphere and soil structure.

B. Exposed tree roots shall be covered with damp burlap covering to keep roots from drying out until excavation is backfilled and roots are covered with soil.

C. Damaged tree roots shall be cut back to uninjured tissue using a well sharpened pruning shear or pruning saw capable of providing a clean, sharp, flush cut.

D. See all requirements for tree root tracing and protection during tree removal.

3.8 DEADWOOD REMOVAL

A. Deadwood, debris and brush within the limits of work indicated on the Contract Documents shall be legally disposed of off-site.

3.9 VEGETATION REMOVAL ON GRADE

A. The work of this Article applies to trees and miscellaneous woody vegetation in same proximity designated for removal from the edges of the Merrimack River and the Concord River. This Article does not apply vegetation removal from the face of the river walls.

B. Trees and miscellaneous woody vegetation in same proximity designated for removal on the plans shall be removed from the site. This work shall include the felling of the trees in such a way as to not injure trees to be saved, adjacent walls, utility lines and poles, buildings, planters, benches, lawns, plantings and pavement. Tree removal also shall include the satisfactory disposal off site of all tree trunks, branches, stumps, roots and vegetative debris produced through the tree removal operation.

C. Tree and miscellaneous woody vegetation removal on grade shall include removing the stumps to their full depth. Remove stumps from the site and dispose of stumps in a legal manner. Take care while removing stumps and roots of trees in in proximity to trees to be protected and retained to remove only those roots associated with the tree to be removed. Identify roots from adjacent trees and leave intact. Roll roots to be saved up in burlap and keep moist until new tree plantings have backfilled the existing roots.

D. Prior to the commencement of tree and plant removal operations the Contractor shall review with the Owner’s Representative those trees to be removed. Under no circumstances shall the tree removal operation commence without the written concurrence of the Owner’s Representative.

E. Tree removal shall include root tracing as specified in this Section. Carefully lift and set aside tree roots of adjacent trees to be saved and protected. Do not damage the roots of adjacent trees during stump removal of trees designed for removal.

F. Coordinate the work of tree removal with the requirements of Section 015639 Tree & Plant Protection.

3.10 REMOVAL OF VEGETATION GROWING FROM CANAL WALLS

A. Canal wall clearing: Clear vegetation that is growing from the faces of canal walls in a manner that does not undermine or damage wall structure. Clearing of vegetation

growing from canal walls, either vertical or horizontal faces shall follow a specific procedure:

B. The eradication of vegetation from the river wall shall be a two phase operation occurring in different seasons of the year. Utilize two of the following eradication control methods based on the timing of the beginning of work. Perform the first phase of chemical application eradication in one season. Monitor the results. Perform the second phase of chemical application eradication in the following appropriate season as indicated below.

C. All acceptable methods of chemical eradication utilize herbicides to poison the plants. The plant material mush have passed beyond its active spring growth period and entered into its active photosynthesis period.

D. The Hack-and-Squirt Method for Trees with Thick Bark

1. Schedule: This treatment method is most effective and minimizes sprouting and suckering when applied during the summer. Do not employ this treatment method during fall, winter and spring seasons as root suckering can be increased.
2. Make downward-angled cuts into the sapwood around the tree trunk using a hand ax. With spray bottle or wand in the other hand, squirt a straight (100%) concentration of a water-soluble triclopyr product into the cuts within a minute or two, applying 1-2 milliliters into each cut (typically 1-2 squirts of a trigger squirt bottle) so that the bottom of the cut is covered, but liquid doesn't run out of it.
3. Make one hack cut for each inch of diameter plus one (i.e., for a 10 inch diameter tree, make about 11 cuts). Space the cuts so that about 1-2 inches of uncut living tissue remains between them. Do not make a continuous line of cuts around the trunk. Girdling or frilling of the tree trunk is prohibited.
4. Monitor the walls for indications that the trees are under chemical stress. Trees should demonstrate mounting symptoms of distress and eventually death within several weeks of the treatment.
5. If by the end of September trees have not responded to treatment then provide follow-on foliage spray of the leaves of the trees.

E. Foliar Spray for Trees, Shrubbery, Grasses, Weeds and Vines

1. Schedule: July & August
2. Apply herbicide by backpack sprayer or truck-mounted sprayer to foliage of trees, shrubbery and vines when the plants are in full leaf. Apply only on days when wind speed is less than 5 mph and rainfall is not forecast within 5 days.
3. Herbicides: systemic herbicides such as glyphosate and triclopyr or approved equals. Concentration of herbicide shall be as approved by the Owner’s Representative based on herbicide manufacturer’s recommendations.. Provide surfactant to help the spray spread over and penetrate the leaves.
4. Foliar application shall be made with spray equipment designed to apply small droplets over the entire plant (stems and leaves). These may be made with backpack applicators or hose-end sprayers. Applicators shall use care to treat only the target species, and not desirable neighboring vegetation. Foliar applications done within wetland limits shall not contain surfactants and shall meet all wetland requirements.
5. Treatment Method: The mixture shall be applied to leaves and green stems, including sprouts and suckers, until thoroughly wet but not to the point of runoff.

6. Monitor the treatment area and provide follow-up treatment with additional foliar applications in subsequent seasons to control any basal sprouts or root suckers that might re-emerge. Follow-on treatment to control basal sprouts or root suckers shall be incidental to this item.

F. Basal bark application for thin bared trees, shrubbery and vines

1. Schedule: 50 degrees F and rising for several days and rain is not expected for at least 48 hours.
2. Treatment Method: Using a handsaw, remove branches and foliage in a band around the stem of the vine or shrub that is no less than 12-inches in length. After removing the branches and foliage back-blade the stem of the plant to expose the green cambium lying directly under the hard, corky bark of the tree. Do not sever the cambium. Simply expose the green cambium to the atmosphere.
3. To the exposed cambium apply an approved solution of triclopyr ester in commercially available basal oil with a penetrant (as recommended by herbicide manufacturer) to the plant stem stems.

G. Monitoring and Follow-on Treatment

1. After initial control treatments, monitor all treated plants and areas through visual observation. Re-treat as necessary and appropriate throughout the following season(s) and for the duration of the contract. Monitoring shall be carried as part of the work of this Article.
2. Dead vegetation, including leaves, stems, branches, trunks and roots shall be removed from the wall surfaces and the stems/trunks removed to a depth of the full width of the river walls. Trace the stems back into the wall and remove woody tissue and roots back to clean soil on the back side of the walls. Avoid undermining soil.

3.11 PUBLIC HEALTH AND SAFETY:

A. Upon encountering any condition of tree work or tree health that might threaten the public health, safety or welfare and that is not directly addressed by this Section, the Certified Arborist and the Contractor shall notify the Owner's Representative immediately and shall make recommendations pertaining to the resolution of said conditions.

PART 4 MEASUREMENT AND PAYMENT

4.1 METHOD OF MEASUREMENT

A. Item 311316.01 Tree Pruning will be measured per EACH tree trunk, including all labor, materials and equipment required or incidental for the satisfactory completion of the Work. This measurement recognizes that the trees along the river bank are multi-stemmed and the unit being measured is EACH tree trunk (stem) growing from the multi-stemmed clump base.

B. Item 311316.02 Tree Removal will be measured per EACH tree as designated and marked in the field and as discussed during the site inspection, including all labor, materials and equipment required or incidental for the satisfactory completion of the Work. Removal of miscellaneous woody vegetation in proximity to trees to be removed

is consider an incidental cost to the Contract and no separate payment will be made for this incidental work.

C. Item 311316.03 Eradication of Vegetation on Riverwalls will be measured per LUMP SUM, including all labor, materials and equipment required or incidental for the satisfactory completion of the Work. Item 311316.03 will be paid for under the work of Section 040305 CONSERVATION TREATMENT OF HISTORIC MASONRY WALLS.

4.2 BASIS OF PAYMENT

A. The Work measured as provided above will be paid by payment items. Such price shall constitute full compensation for all labor, materials and equipment required or incidental for the satisfactory completion of the Work as described in this Section.

4.3 PAYMENT ITEMS

311316.01	TREE PRUNING	EACH
311316.02	TREE REMOVAL	EACH
311316.03	ERADICATION OF VEGETATION ON RIVER WALLS	LUMP SUM

END OF SECTION